IN THE DRAWINGS

Please add new Figures 8, 9, 10 and 11, as shwon in the attached New Sheets. These Figures show Algorithms I – IV described on pages 9 -14 of the specification in a flowchart format. They depict the same information as that in the specification. No new matter has been introduced by these new Figures.

Attachment: Four New sheets for Figures 8 – 11.

REMARKS

Please reconsider the application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully considering this application.

Preliminary Matter

Pursuant to a new Power of Attorney filed herewith, Applicant respectfully requests that the attorney docket number be changed to **09428/186001** and all future communications be directed to the address associated with customer number **55346**.

Disposition of Claims

Claims 1-15 are pending in this application. Claims 1, 10, 11, and 12 are independent. The remaining claims depend, directly or indirectly, from claims 1, 10, 11, and 12.

Claim Amendments

Claim 14 has been amended to correct typographical errors that caused claim 14 to be identical to claim 13. Support for these amendments can be found on page 15, lines 5-7 of the specification. No new matter has been introduced by these amendments.

Claims 1, 3-4, 7-9, and 12 have also been amended to correct typographical errors. Specifically, "depth correction logic means" has been amended to "depth correction logic." "Depth correction logic" is shown as 260 in Fig. 2 and described, for example, on page 8, line 3 and page 9, line 17 in the specification. No new matter has been introduced by these amendments.

Because these amendments correct typographical errors, Applicant asserts that they do not change the scope of the invention and believes that no further search is necessary.

Specification Objection:

The specification is objected to as failing to provide antecedent basis for "depth correction logic means." As noted above, "depth correction logic means" is a typographical error and has been amended to "depth correction logic." The "depth correction logic" is illustrated as 260 in Fig. 2 and described, for example, on page 8, line 3 and page 9, line 17 in the specification. Accordingly, withdrawal of this objection is respectfully requested.

Drawing Objections:

The drawings are objected to as not showing every feature of the invention specified in the claims.

As noted above, "depth correction logic means" has been amended to "depth correction logic," which is illustrated in Fig. 2 as 260. Therefore, the rejection with respect to this element is now moot.

With respect to flow charts needed to show the steps of the methods, new Figures 8-11 that depict Algorithms I, II, III and IV in the specification have been added by this reply. The "Brief Description of the Drawings" section has been amended to reflect the addition of these new figures. Accordingly, withdrawal of this rejection is respectfully requested.

Applicant respectfully notes that since no amendment is made to the existing drawings, there is no need to provide red-inked marked-up sheets. In addition, a separate letter to the

Draftsperson is no longer required, pursuant to the amended 37 C.F.R. § 1.121(d). Please see:

http://www.uspto.gov/web/offices/pac/dapp/revised121qnas.htm#C sections C1 and C4.

Rejections Under 35 U.S.C. §112

Claims 1-15 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with

the enablement requirement because "depth correction logic means" was not described. This

rejection is respectfully traversed.

As noted above, "depth correction logic means" was a typographical error and has been

changed to "depth correction logic." Depth correction logic is shown in FIG. 2 as 260 and

described, for example, on page 8, line 3 and page 9, line 17 in the specification. Examples of

how to implement such a depth correction logic are illustrated in Algorithms I - IV and described

on pages 9 - 14. Algorithms I - IV specifically set forth, in pseudo codes, steps needed to

program the particular functions. Applicant respectfully asserts that one of ordinary skill in the

art would know how to program these steps (i.e., conversion of the pseudo codes into source

codes) using an appropriate language without undue experimentation. Accordingly, withdrawal

of this rejection is respectfully requested.

Rejections Under 35 U.S.C. §103(a)

Claims 1-15 are rejected under 35 U.S.C. § 103(a) as being obvious over McRobbie et al.

(U.S. Patent No. 6,145,378). This rejection is respectfully traversed.

Embodiments of the present invention relate to methods and systems for correcting errors

in measurement depth. Errors in measurement depth often result from elasticity of the wireline

cable and sticking of the tool in the wellbore. A method or system in accordance with

embodiments of the invention uses two or more sensors (e.g., pressure sensors) separated by a known distance. The known distance between the sensors is used as a standard to correct any error in the measured depth, which is typically based on the length of the wireline cable in the wellbore.

Note that the object of the invention relates to *depth* correction, not *velocity* measurements. While velocity measurements depend on accurate measurements of distance and time, depth correction does not need any measurement of "time." In accordance with a typical method of the invention, when the tool has traveled (regardless of the traveling speed) a distance equals the distance between the two sensors, the first sensor will detect the same pressure as that previously recorded by the second sensor. Thus, the distance between the two sensors may be used to identify and correct any error in the length of a wireline cable. Note that the algorithms of the invention are not affected by changes in borehole deviation or variations in density of the mud. (specification, p. 8, ll. 1-13).

Independent claim 1 recites a system for depth correction that includes "*a depth correction logic operable to instruct the CPU to compute a corrected depth from pressure readings of the first and second pressure sensors.*" Independent claim 12 recites a similar system with a similar limitation.

Independent claim 10 recites a method for depth correction that includes "*comparing the first pressure to previously recorded values for the second pressure; and setting a corrected depth value to be a previously recorded depth value according to an entry in which a previously recorded value for the second pressure is substantially equal to the first pressure adjusted for the distance between the first pressure sensor and the second pressure sensor.*"

Independent claim 11 recites an "inch worm" method described on p. 13, line 14 – p. 14, line 10. The "inch worm" method includes the following steps: (a) initialize the depth value against a known depth; (b) move the tool until the first pressure sensor reads the same value as that previously recorded by the second sensor; (c) update the depth value by adding the sensor distance to the previous depth; and (d) repeat steps (b) and (c). Specifically, claim 11 includes the following limitations:

"a. determining the pressure of a second pressure sensor at a known depth in a borehole, setting a second pressure variable equal to that pressure, and setting a current depth variable equal to the known depth;

b. moving a well-logging instrument to a location wherein a first pressure sensor observes a pressure substantially equal to the second pressure variable;

c. adding the distance between the first and second pressure sensor to the current depth variable, and setting the second pressure variable equal to the pressure observed by the second pressure sensor after step b; and

d. repeating steps b and c until a desired depth has been reached or a desired condition has been met."

In contrast, McRobbie et al. teaches methods for inertial navigation system data correction. A method of McRobbie et al. is based on *velocity* that is computed from a known distance and the time needed to travel the known distance. The known distance is based on an external marker, such as the pipe joints, or a known distance between two sensors. In a method using two sensors, the method includes determining the velocity of the tool from the elapsed time between each sensor's detection of the marker point within the pipe. (Col. 3, ll. 19-25). Preferably, the marker point is defined by a joint between sections of the pipe (which can be detected by magnetic sensors). The sensors may also be pressure sensors which detect positions of the same pressure. (Col. 3, ll. 26-30). Regardless of the sensors used, a method of McRobbie

et al. uses a unique thickness of the pipe joint or a specific pressure in the well as a reference point to determine the elapsed time between the first and second sensors' crossing of this reference point.

It should be noted that the methods of McRobbie et al. using pressure sensors cannot be applied in high angle applications (i.e., deviated or horizontal borehole), because there will be no significant or measurable hydrostatic pressure difference between the two sensors. (Col. 6, ll. 16-20). In this case, the time measurement will be highly inaccurate – because the two sensors will detect the same pressure almost at the same time, i.e., the elapsed time will appear to approach zero, which will produce a computed velocity approaching infinity. Since this artifact creeps in gradually with increasing deviation of the well, there is no way of knowing beforehand when this will occur. Therefore, one cannot easily pre-program the method to skip the "black-out" regions.

In contrast, a method of the invention is for correcting *depth* index, not for computing *velocity*. It updates the depth index based on the distance between the two sensors; there is no time factor involved. Therefore, algorithms of the invention are not affected by changes in borehole deviation or variations in density of the mud. (Specification, p. 8, ll. 12-13).

For reasons set forth above, the methods of McRobbie et al. are very different from methods of the invention. More importantly, McRobbie et al. does not teach or suggest every limitation of the independent claims 1 and 10-12 of the present invention.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) *must teach or suggest all the claim limitations. See*

MPEP § 2143 -2143.03 (emphasis added). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).
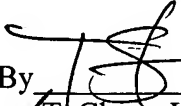
Because McRobbie et al. fails to teach or suggest all limitations of the independent claims 1 and 10-12, these independent claims are patentable over McRobbie et al. Dependent claims should also be patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Conclusion

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 09428/186001).

Dated: September 14, 2005   Respectfully submitted,

By _____ #45079

T. Chyau Liang, Ph.D.   THOMAS SCHERER
Registration No.: 48,885
OSHA · LIANG LLP
1221 McKinney St., Suite 2800
Houston, Texas 77010
(713) 228-8600
(713) 228-8778 (Fax)
Attorney for Applicant